

COMPARISON OF TREATMENTS OF CONTROLLING KUDZU PRIOR TO PLANTING TREE SEEDLINGS

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Abstract—Seven herbicide treatments were applied to well-established patches of kudzu in Mississippi and South Carolina. Six treatments were applied at each location; five treatments were the same at both locations, and one treatment was applied at one site only. Treatments were evaluated for brownout of the kudzu at 30 and 60 days after treatment (DAT). Percent control of the kudzu was evaluated at 30-day intervals during the growing season following application. Five of the seven treatments demonstrated excellent control of the kudzu. Escort® XP (4 ounces per acre; hereafter acre = A), Oust® Extra (8 ounces per A), Escort + Telar tank mixes (4 ounces + 2 ounces and 2 ounces + 4 ounces, respectively) and Tordon® K (1 gallon per A) all provided more than 90 percent control of the kudzu. Transline® (21 ounces per A) and Krenite® (1 gallon per A) did not provide desirable levels of control.

INTRODUCTION

Kudzu [*Pueraria montana* (Lour.) Merr.] could be considered the original exotic invasive species of the South. It has been present in the southern United States for more than 100 years and continues to spread over more acres each year. Estimates of total coverage vary, but all agree that millions of acres are covered by the vine, and these acres are now considered non-productive. While the plant does not reproduce well by seed, it spreads aggressively by vegetative growth and excludes all other plants after it colonizes an area.

MATERIALS AND METHODS

Study Sites

The study site in Mississippi was located approximately 8 miles southeast of Winona, MS, on land owned by non-industrial private landowners. The kudzu on this site is at least 14 years old, and previous land use was agricultural cultivation. The South Carolina site was a former homeplace located on the Clemson School Forest. The kudzu is at least 40 years old.

Treatments

A complete list of treatments is presented in table 1. These treatments include both proven "standards" for use in kudzu as well as previously untested applications.

Table 1—Treatments applied in 2003 kudzu control project

Treatment number	Herbicide ^a and rate/acre
1	Escort® XP (4 oz)
2	Transline® (21 oz)
3	Oust® Extra (8 oz)
4	Escort® XP (4 oz) + Telar (2 oz)
5	Tordon® K (128 oz)
6 ^b	Escort® XP (2 oz) + Telar (4 oz)
7 ^c	Krenite® (128 oz)

^a All treatments had Timberland 90 surfactant added at 1 percent v/v.

^b Mississippi site only.

^c South Carolina site only.

Plot Information

All treatment plots were 0.125 acre. Most were rectangular areas 55 feet x 109 feet, but some were of different dimensions due to the parameters of the kudzu patch. All treatments were replicated three times at each site for a total of 18 treated plots at each location. Plot corners were marked with PVC pipe, and the plot number, treatment number, and replication information was imprinted on a metal tag attached to a designated corner post of each plot.

Application Information

All treatments were applied using an ATV equipped with a 30-gallon tank, electric pump, 50 feet of rubber hose, and a hand-held wand with an adjustable cone nozzle. Total spray volume for all applications was 60 gallons per acre (gpa). Treatments in Mississippi were applied on August 9, 2003, and in South Carolina on September 4, 2003. The perimeter of all plots in Mississippi were treated with Escort XP® (4 ounces per A) to prevent encroachment by kudzu. This outside perimeter treatment was not conducted in South Carolina.

Evaluation

An ocular evaluation of percent brownout was completed at 30 and 60 days after treatment (DAT). Ocular estimates of the percent ground coverage by kudzu was completed in June, July, August, and September, 2004 in Mississippi. The same estimate was completed in June and September, 2004, in South Carolina.

Data Analysis

All data was subjected to analysis of variance. Means were separated using Duncan's New Multiple Range Test with $\alpha = 0.05$.

RESULTS

Brownout

Average brownout results are presented in table 2. Generally, the treatments containing metsulfuron provided 60-70 percent brownout at 30 DAT and 90 percent at 60 DAT. The Transline treatment resulted in 67 brownout at 30 DAT and 87 percent at 60 DAT. The Krenite did not result in as much brownout

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Table 2—Average percent brownout at 30 and 60 days after treatment (average all replications)

Treatment	Time of observation	
	30 DAT	60 DAT
	----- percent -----	
Escort XP (4 oz)	70	91
Transline (21 oz)	67	83
Oust Extra (8 oz)	57	93
Escort XP (4 oz) + Telar (2 oz)	73	92
Tordon K (128 oz)	95	99
Escort XP (2 oz) + Telar (4 oz)	77	91
Krenite (128 oz)	*	35

* No data

response and had only 35 percent response by 60 DAT. Tordon® K is highly effective on kudzu and was 95 and 100 percent brown at 30 and 60 DAT evaluations, respectively.

Percent Control

Percent control was estimated by the amount of ground covered by the kudzu—i.e., the less ground covered, the greater the control. This was a viable approach since both study sites began with 100 percent coverage. Average percent coverage in Mississippi is presented in table 3. In June, all treatments

except Transline had reduced the kudzu to approximately 5 percent ground cover. At that time, all resprouting tubers were marked with a pin flag. Subsequent evaluation recorded that increased coverage was due to growth of the kudzu vines, but no new origins were noted in any plots except in Transline treatments. Overall, control was excellent, and the patch could have been eliminated if follow-up treatment had been applied in all treatment areas except Transline. In South Carolina, percent ground cover was greater than in Mississippi (table 4), but those estimates included vine growth which was encroaching from outside the treatment plots. Tordon® K treatments provided very good control, which appeared to allow less encroachment than the other herbicides. While ground coverage was greater, control with the treatment plots appeared to be as good as comparable treatments in Mississippi. Only the Krenite and Transline treatments failed to provide desirable levels of control in the South Carolina plots.

SUMMARY

Five of the seven treatments provided control which could eradicate kudzu with proper follow-up treatments. The previously untested treatments of Oust Extra and Escort/ Telar mixes provided control comparable to the proven Escort XP and Tordon® K treatments. All treatments except Tordon® K can be applied in areas with pines and many species of hardwoods with no damage to the trees. Forest land managers should be able to use these five treatments successfully on established kudzu areas.

Table 3—Average percent kudzu cover by treatment and time of observation-MS (average all replications)

Treatment	Time of 2004 observations			
	June	July	August	September
	----- percent -----			
Escort XP (4 oz)	3.3a ^a	8.3a	18.0a	23.3a ^b
Transline (21 oz)	28.3b	37.3b	57.0b	76.7b
Oust Extra (8 oz)	1.7a	6.7a	8.3a	13.3a
Escort XP (4 oz) + Telar (2 oz)	3.0a	5.0a	6.3a	13.3a
Tordon K (128 oz)	3.0a	10.0a	16.7a	20.0a
Escort XP (2 oz) + Telar (4 oz)	6.0a	6.7a	8.3a	21.7a

^a Values in a column followed by the same letter do not differ at $\alpha = 0.05$.

^b Increase in coverage due to vine growth; no new sprouts in any treatment area except Transline treatment.

Table 4—Average percent kudzu cover by treatment and time of observation-SC (average all replications)

Treatment	Time of 2004 observations	
	June ^a	September
	----- percent -----	
Escort XP (4 oz)	21.7a ^b	50.0b
Transline (21 oz)	70.0c	60.0b
Oust Extra (8 oz)	16.7a	56.7b
Escort XP (4 oz) + Telar (2 oz)	20.0a	66.7b
Tordon K (128 oz)	11.7a	21.7a
Krenite (128 oz)	36.7b	96.7c

^a Includes kudzu coverage from vines encroaching from outside plot boundaries.

^b Values in a column followed by the same letter do not differ at $\alpha = 0.05$.